

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: INVUE

Report Number: P553660

Luminaire Tested: **ARB-B2-LED-D1-T4**

Issue Date: 7/12/2021

**Test Information**

Test Method: LM-79-08  
Report Number: P553660  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P34663)  
Test Lab: INNOVATION CENTER  
Issue Date: 7/12/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: ARB-B2-LED-D1-T4  
Description: ARBOR OUTDOOR ARCHITECTURAL POST TOP  
70 CRI, 4000K LEDS AND TYPE IV OPTIC  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 4691 lumens  
Efficiency: N/A  
Efficacy: 97.7 lumens/watt  
Luminous Opening: Circular (Dia: 1.62' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 48  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

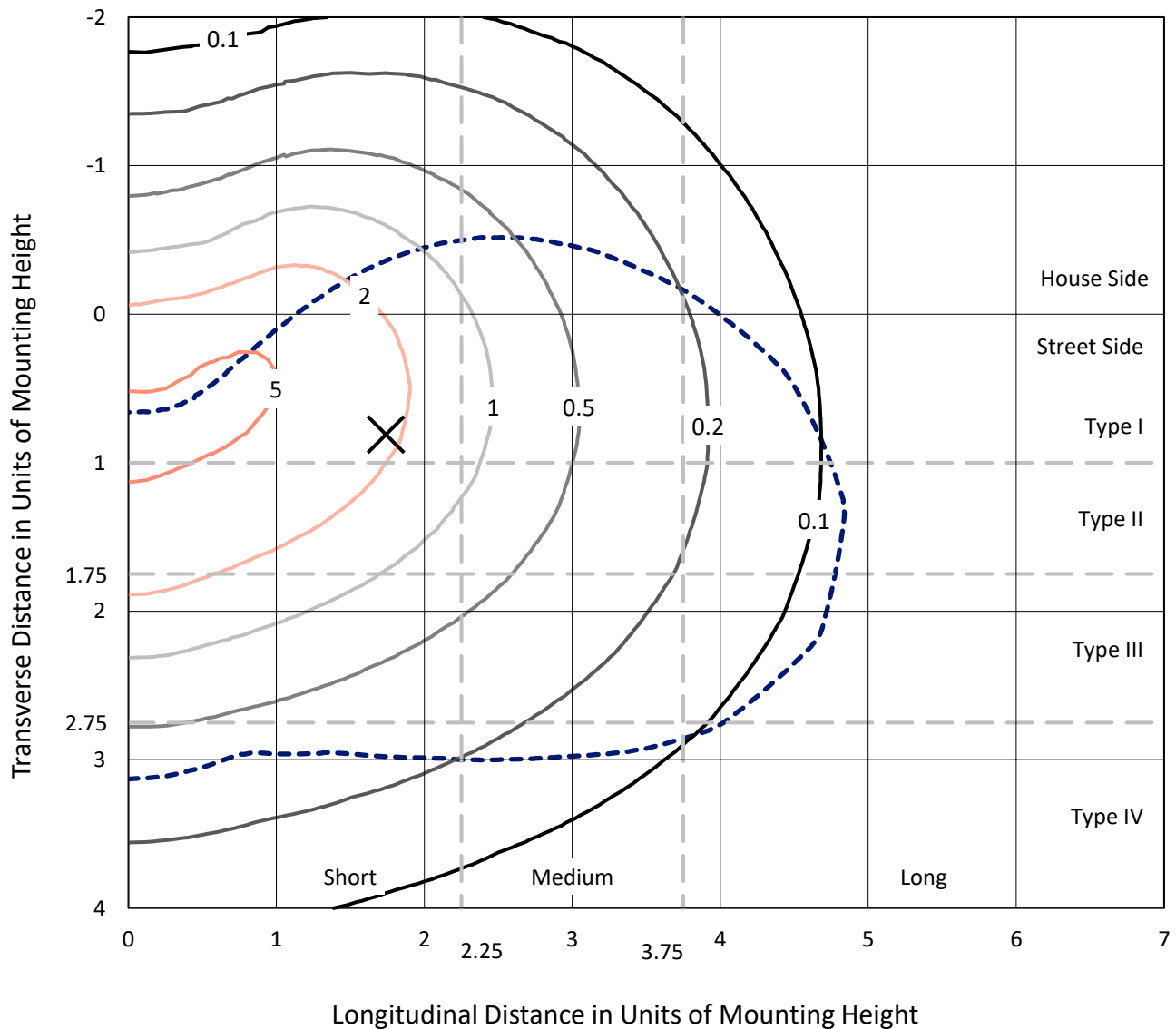


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CATALOG NUMBER: ARB-B2-LED-D1-T4

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

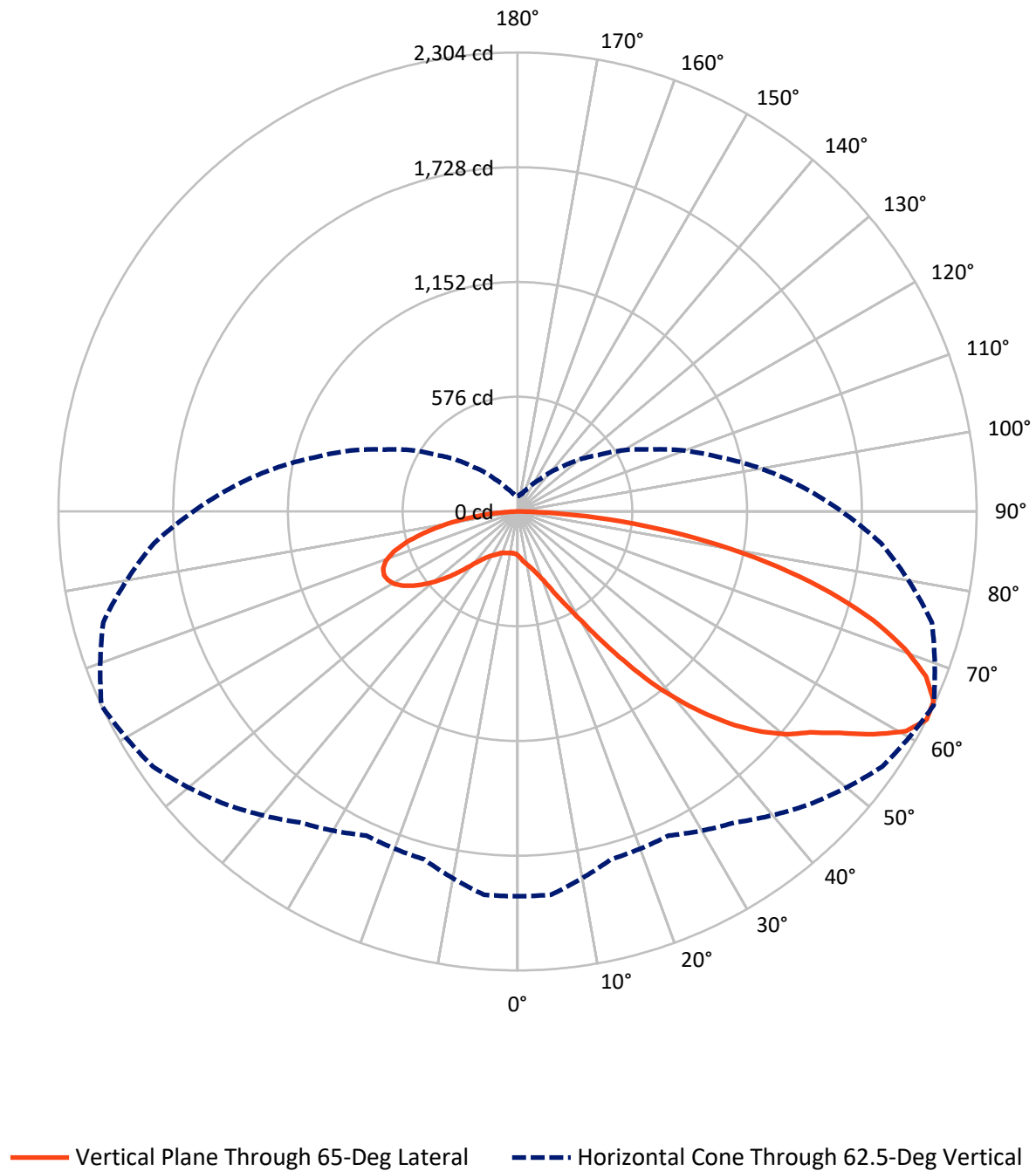


Based on 10 foot mounting height. Maximum calculated value = 7.4 fc  
 Type IV - Short - N/A

REPORT NUMBER: P553660

CATALOG NUMBER: ARB-B2-LED-D1-T4

## Luminous Intensity Polar Plot



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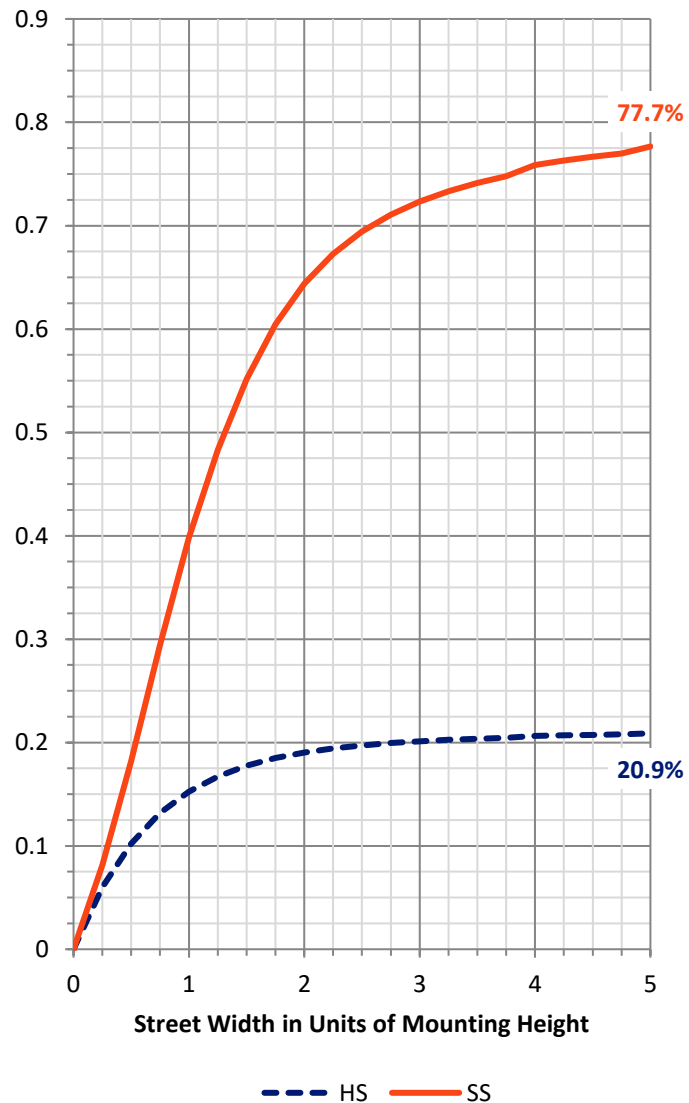
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 991.6    | 0.0    | 991.6  |
|                    | % Fixture | 21.1     | 0.0    | 21.1   |
| <b>Street Side</b> | Lumens    | 3699.4   | 0.0    | 3699.4 |
|                    | % Fixture | 78.9     | 0.0    | 78.9   |
| <b>Total</b>       | Lumens    | 4691.0   | 0.0    | 4691.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 22.2   | 0.5       |
| 10°-20°   | 74.3   | 1.6       |
| 20°-30°   | 167.9  | 3.6       |
| 30°-40°   | 398.3  | 8.5       |
| 40°-50°   | 712.7  | 15.2      |
| 50°-60°   | 1038.6 | 22.1      |
| 60°-70°   | 1183.4 | 25.2      |
| 70°-80°   | 852.9  | 18.2      |
| 80°-90°   | 240.8  | 5.1       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 4691.0 | 100.0     |
| 0°-180°   | 4691.0 | 100.0     |

**Coefficient of Utilization**



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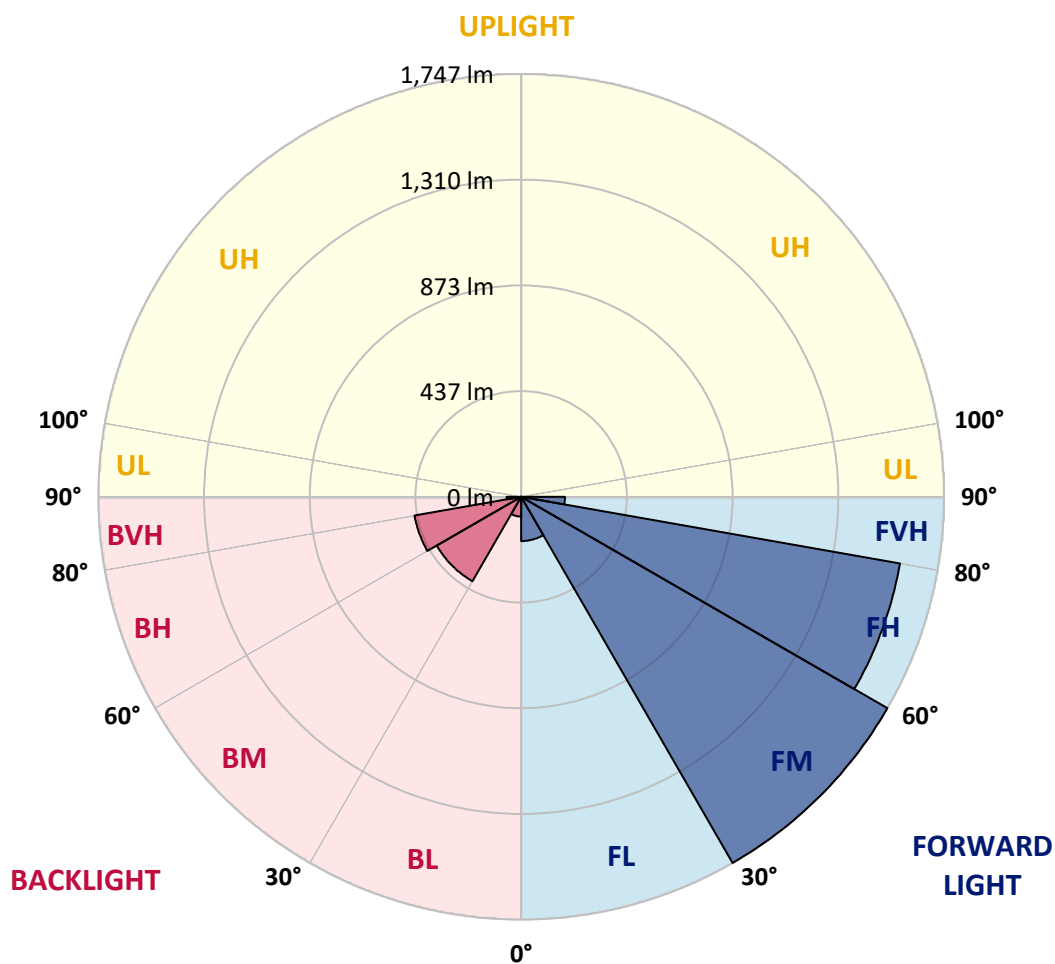
CATALOG NUMBER: ARB-B2-LED-D1-T4

**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 182.7  | 3.9       |                         |      |         |
| FM   | (30°-60°)   | 1746.8 | 37.2      |                         |      |         |
| FH   | (60°-80°)   | 1589.1 | 33.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 180.7  | 3.9       |                         |      | G2/225  |
| BL   | (0°-30°)    | 81.7   | 1.7       | B0/110                  |      |         |
| BM   | (30°-60°)   | 402.7  | 8.6       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 447.2  | 9.5       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 60.0   | 1.3       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 219.7  | 219.7  | 219.7  | 219.7  | 219.7  | 219.7  | 219.7  | 219.7  | 219.7  | 219.7  | 219.7  |
| 2.5°  | 245.6  | 243.5  | 243.5  | 242.9  | 240.8  | 238.1  | 234.8  | 230.5  | 227.8  | 223.5  | 221.3  |
| 5°    | 267.2  | 267.2  | 266.1  | 264.5  | 261.3  | 256.9  | 251.0  | 245.1  | 238.6  | 231.0  | 227.8  |
| 7.5°  | 287.7  | 287.7  | 286.6  | 282.9  | 279.1  | 274.2  | 266.7  | 258.6  | 249.4  | 239.1  | 234.3  |
| 10°   | 310.4  | 309.3  | 306.6  | 302.3  | 296.9  | 289.9  | 281.8  | 272.1  | 261.3  | 248.8  | 242.4  |
| 12.5° | 329.3  | 329.3  | 328.2  | 323.9  | 316.9  | 307.7  | 298.5  | 287.2  | 275.3  | 259.6  | 252.1  |
| 15°   | 350.3  | 349.8  | 349.8  | 346.6  | 340.6  | 330.9  | 319.0  | 307.7  | 292.6  | 272.1  | 263.4  |
| 17.5° | 390.3  | 388.7  | 384.3  | 375.2  | 368.7  | 361.1  | 349.8  | 333.6  | 314.2  | 288.3  | 276.4  |
| 20°   | 443.7  | 446.4  | 432.9  | 417.3  | 404.3  | 397.8  | 387.6  | 366.5  | 338.5  | 302.3  | 287.2  |
| 22.5° | 527.4  | 523.6  | 500.4  | 483.1  | 461.5  | 449.1  | 441.0  | 412.4  | 374.1  | 329.3  | 309.3  |
| 25°   | 612.7  | 610.0  | 585.7  | 561.9  | 538.2  | 526.3  | 509.6  | 475.6  | 418.9  | 363.8  | 336.3  |
| 27.5° | 695.3  | 695.8  | 677.5  | 655.3  | 639.1  | 626.7  | 595.9  | 550.6  | 474.5  | 404.3  | 371.9  |
| 30°   | 830.2  | 842.6  | 807.0  | 793.0  | 785.4  | 773.0  | 730.4  | 640.2  | 549.0  | 456.7  | 414.6  |
| 32.5° | 1085.0 | 1078.5 | 1028.3 | 971.1  | 954.4  | 934.9  | 879.9  | 771.9  | 651.0  | 526.3  | 471.2  |
| 35°   | 1358.7 | 1341.4 | 1251.3 | 1169.8 | 1122.8 | 1090.4 | 1040.7 | 919.8  | 772.5  | 623.5  | 551.1  |
| 37.5° | 1471.0 | 1465.6 | 1407.3 | 1343.6 | 1291.7 | 1251.3 | 1204.3 | 1089.9 | 922.0  | 735.2  | 639.7  |
| 40°   | 1561.7 | 1560.0 | 1513.6 | 1461.8 | 1435.9 | 1390.5 | 1341.4 | 1244.2 | 1078.0 | 859.4  | 753.6  |
| 42.5° | 1622.1 | 1622.6 | 1581.1 | 1541.1 | 1535.2 | 1507.1 | 1473.1 | 1392.2 | 1219.4 | 984.1  | 863.1  |
| 45°   | 1671.2 | 1671.8 | 1608.1 | 1591.3 | 1607.5 | 1609.2 | 1590.3 | 1531.4 | 1359.8 | 1125.5 | 984.1  |
| 47.5° | 1712.3 | 1710.1 | 1628.6 | 1608.1 | 1650.7 | 1695.0 | 1688.0 | 1652.3 | 1499.0 | 1251.3 | 1102.3 |
| 50°   | 1731.7 | 1725.8 | 1638.3 | 1620.5 | 1671.8 | 1740.9 | 1759.2 | 1758.1 | 1624.8 | 1363.0 | 1214.6 |
| 52.5° | 1812.7 | 1794.8 | 1696.1 | 1679.3 | 1724.7 | 1808.3 | 1840.2 | 1841.3 | 1741.4 | 1471.0 | 1315.5 |
| 55°   | 2096.6 | 2090.7 | 1921.2 | 1833.7 | 1856.9 | 1948.7 | 1973.0 | 1962.2 | 1859.6 | 1571.4 | 1410.0 |
| 57.5° | 2123.0 | 2113.9 | 1987.6 | 1920.1 | 1963.3 | 2064.2 | 2122.0 | 2110.1 | 1987.0 | 1675.0 | 1484.5 |
| 60°   | 2055.6 | 2038.3 | 1922.2 | 1890.9 | 1971.4 | 2106.9 | 2217.5 | 2239.1 | 2083.1 | 1773.3 | 1575.1 |
| 62.5° | 1931.4 | 1930.9 | 1808.3 | 1794.8 | 1905.0 | 2076.6 | 2233.7 | 2303.9 | 2152.7 | 1831.0 | 1626.4 |
| 65°   | 1765.7 | 1760.8 | 1656.7 | 1669.6 | 1794.8 | 1987.6 | 2177.6 | 2294.2 | 2168.4 | 1840.7 | 1639.9 |
| 67.5° | 1495.8 | 1509.3 | 1458.5 | 1525.5 | 1652.9 | 1860.7 | 2070.1 | 2211.0 | 2111.7 | 1796.5 | 1608.1 |
| 70°   | 1296.6 | 1310.1 | 1277.7 | 1351.7 | 1490.9 | 1699.3 | 1928.2 | 2060.4 | 1982.7 | 1702.0 | 1527.6 |
| 72.5° | 1134.7 | 1129.3 | 1103.4 | 1180.0 | 1312.3 | 1507.7 | 1732.8 | 1867.7 | 1799.7 | 1553.6 | 1398.6 |
| 75°   | 959.2  | 949.0  | 923.6  | 988.9  | 1123.3 | 1295.0 | 1491.5 | 1619.9 | 1563.3 | 1367.3 | 1226.4 |
| 77.5° | 776.2  | 769.2  | 743.8  | 794.1  | 898.8  | 1072.0 | 1249.6 | 1337.6 | 1302.0 | 1134.1 | 1017.5 |
| 80°   | 604.6  | 590.0  | 562.5  | 600.8  | 688.8  | 820.5  | 954.9  | 1026.7 | 989.5  | 863.7  | 776.8  |
| 82.5° | 399.5  | 412.4  | 400.5  | 402.2  | 481.0  | 577.6  | 682.9  | 709.3  | 690.9  | 592.7  | 537.6  |
| 85°   | 237.0  | 231.0  | 222.4  | 224.6  | 265.6  | 333.1  | 386.0  | 403.2  | 386.5  | 325.5  | 299.6  |
| 87.5° | 50.7   | 53.4   | 55.6   | 49.7   | 68.6   | 90.7   | 102.0  | 104.2  | 105.8  | 91.2   | 80.4   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: ARB-B2-LED-D1-T4

**CANDELA DISTRIBUTION (continued):**

|       | 95°    | 105°   | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 219.7  | 219.7  | 219.7 | 219.7 | 219.7 | 219.7 | 219.7 | 219.7 | 219.7 | 219.7 |
| 2.5°  | 219.7  | 216.5  | 213.8 | 211.1 | 208.9 | 207.8 | 206.7 | 206.2 | 205.7 | 206.2 |
| 5°    | 224.6  | 218.1  | 212.1 | 206.7 | 202.4 | 199.2 | 195.9 | 194.3 | 192.7 | 192.7 |
| 7.5°  | 229.4  | 219.7  | 210.5 | 202.4 | 195.4 | 188.9 | 184.6 | 181.9 | 179.8 | 179.8 |
| 10°   | 235.4  | 222.9  | 210.5 | 199.2 | 189.5 | 181.9 | 174.9 | 171.1 | 168.4 | 167.9 |
| 12.5° | 244.0  | 227.8  | 212.7 | 198.6 | 186.2 | 176.0 | 167.9 | 161.9 | 158.7 | 158.2 |
| 15°   | 253.7  | 233.7  | 214.8 | 198.6 | 183.5 | 169.5 | 159.8 | 152.8 | 149.0 | 147.9 |
| 17.5° | 263.4  | 239.7  | 218.1 | 198.1 | 179.8 | 164.1 | 152.8 | 144.7 | 140.9 | 139.8 |
| 20°   | 273.1  | 245.1  | 219.2 | 195.9 | 175.4 | 158.7 | 145.7 | 137.6 | 132.8 | 132.8 |
| 22.5° | 291.0  | 256.4  | 226.2 | 197.6 | 174.4 | 155.5 | 140.3 | 131.7 | 127.4 | 126.3 |
| 25°   | 314.7  | 271.0  | 234.3 | 200.8 | 173.8 | 152.2 | 136.0 | 126.3 | 122.0 | 120.9 |
| 27.5° | 342.8  | 288.3  | 243.5 | 204.6 | 173.8 | 149.5 | 132.3 | 122.0 | 116.6 | 116.6 |
| 30°   | 377.3  | 308.8  | 253.2 | 208.9 | 173.3 | 146.8 | 128.5 | 117.7 | 112.8 | 112.3 |
| 32.5° | 421.6  | 336.3  | 265.0 | 212.7 | 173.3 | 144.7 | 125.2 | 113.9 | 108.5 | 108.0 |
| 35°   | 482.6  | 368.7  | 282.3 | 219.7 | 174.4 | 144.1 | 123.6 | 111.2 | 105.3 | 104.7 |
| 37.5° | 557.1  | 414.6  | 306.1 | 233.2 | 179.8 | 145.7 | 123.6 | 110.1 | 104.2 | 103.6 |
| 40°   | 645.6  | 471.2  | 337.4 | 249.9 | 190.0 | 150.6 | 126.3 | 111.7 | 104.7 | 104.2 |
| 42.5° | 747.6  | 533.9  | 381.1 | 275.8 | 205.1 | 157.1 | 127.9 | 111.7 | 104.7 | 103.6 |
| 45°   | 850.7  | 611.6  | 432.4 | 302.3 | 217.0 | 162.5 | 127.4 | 110.7 | 103.6 | 102.6 |
| 47.5° | 954.9  | 693.6  | 486.4 | 333.1 | 230.0 | 167.3 | 128.5 | 109.6 | 101.5 | 100.4 |
| 50°   | 1059.1 | 771.9  | 540.3 | 367.1 | 246.7 | 170.6 | 130.1 | 106.9 | 99.3  | 97.7  |
| 52.5° | 1154.6 | 855.6  | 592.2 | 400.5 | 265.0 | 178.7 | 130.6 | 104.2 | 96.6  | 95.5  |
| 55°   | 1235.1 | 924.1  | 641.3 | 437.2 | 285.6 | 187.3 | 130.1 | 103.1 | 93.4  | 92.3  |
| 57.5° | 1311.7 | 979.2  | 683.9 | 463.2 | 300.1 | 192.2 | 131.2 | 100.9 | 89.6  | 88.5  |
| 60°   | 1383.5 | 1021.3 | 716.3 | 483.1 | 310.9 | 196.5 | 130.6 | 97.7  | 84.7  | 84.7  |
| 62.5° | 1430.5 | 1049.9 | 735.2 | 492.8 | 317.4 | 197.6 | 129.0 | 93.9  | 79.9  | 78.3  |
| 65°   | 1442.4 | 1064.5 | 742.2 | 495.0 | 316.3 | 194.3 | 123.1 | 90.1  | 73.4  | 71.3  |
| 67.5° | 1411.6 | 1051.5 | 732.5 | 485.3 | 307.1 | 185.7 | 114.4 | 83.7  | 64.8  | 64.2  |
| 70°   | 1342.5 | 1006.2 | 704.4 | 463.2 | 290.4 | 174.4 | 104.2 | 75.6  | 58.3  | 56.1  |
| 72.5° | 1233.5 | 926.3  | 652.6 | 429.1 | 265.6 | 159.8 | 95.0  | 66.9  | 53.4  | 51.3  |
| 75°   | 1083.4 | 820.0  | 577.0 | 381.1 | 234.8 | 140.9 | 85.3  | 57.8  | 49.1  | 47.5  |
| 77.5° | 902.6  | 681.8  | 483.1 | 322.8 | 199.2 | 120.9 | 74.0  | 48.0  | 44.3  | 44.3  |
| 80°   | 686.1  | 537.1  | 378.9 | 252.6 | 157.1 | 96.1  | 61.0  | 39.9  | 38.3  | 38.9  |
| 82.5° | 469.1  | 367.1  | 263.4 | 177.1 | 113.4 | 72.3  | 46.4  | 32.4  | 31.8  | 31.8  |
| 85°   | 254.8  | 207.8  | 149.5 | 105.3 | 67.5  | 47.0  | 31.8  | 24.8  | 24.8  | 24.8  |
| 87.5° | 78.8   | 63.7   | 44.3  | 33.5  | 27.5  | 22.1  | 18.9  | 16.7  | 17.8  | 17.8  |
| 90°   | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2205-670-4

Test Date: 07/01/2022

Luminaire Tested: LXS-VA1-740-U-ASW-A

Data in this report applies to families of products including LXS-VA1-740.

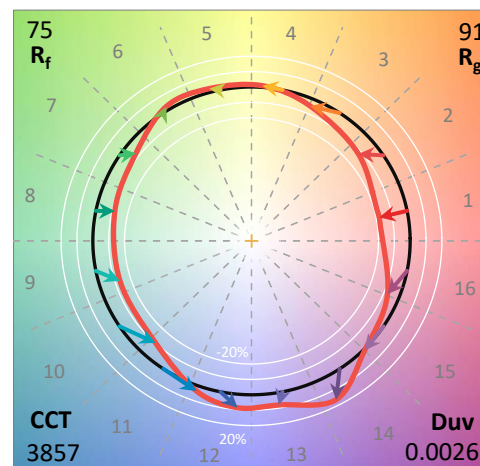
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2205-670-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 07/01/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **LXS-VA1-740-U-ASW-A**  
 Description: INVUE LUXESCAPE

ARM MOUNT

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3857   | CRI (Ra): | 71.9 |      |       |
| CIE u':                   | 0.2263 | R1:       | 67.8 | R9:  | -35.4 |
| CIE v':                   | 0.5075 | R2:       | 80.8 | R10: | 54.2  |
| Duv:                      | 0.0026 | R3:       | 90.4 | R11: | 61.9  |
| CIE x:                    | 0.3890 | R4:       | 67.8 | R12: | 38.9  |
| CIE y:                    | 0.3876 | R5:       | 67.1 | R13: | 70.5  |
| CIE z:                    | 0.2234 | R6:       | 71.9 | R14: | 94.7  |
| Peak Wavelength (nm):     | 454    | R7:       | 80.8 |      |       |
| Dominant Wavelength (nm): | 578    | R8:       | 48.4 |      |       |
| Purity:                   | 33.2   |           |      |      |       |
| Rf:                       | 74.8   |           |      |      |       |
| Rg:                       | 91     |           |      |      |       |



### Test Conditions

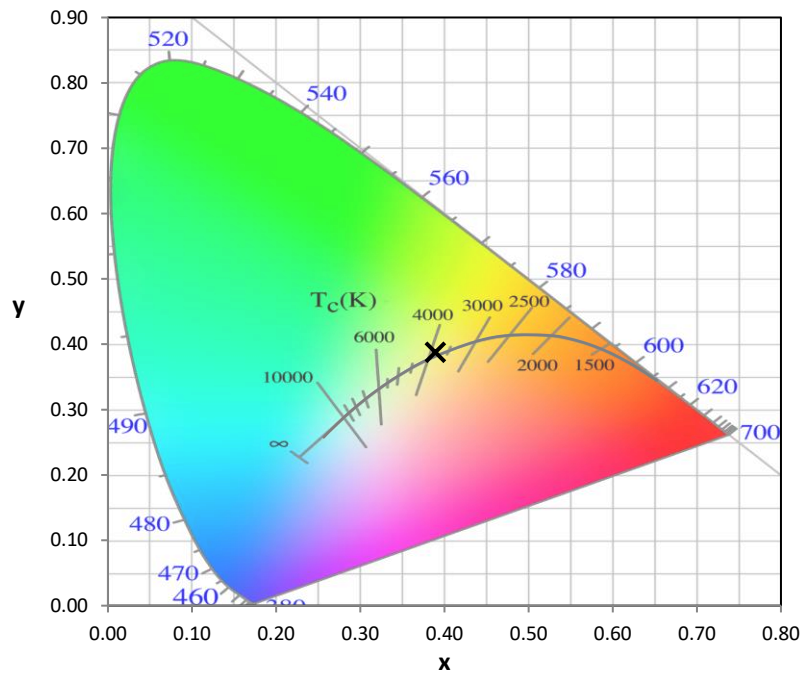
Stabilization Time: 247M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.5/62%  
 Sphere Temperature (°C): 25.6

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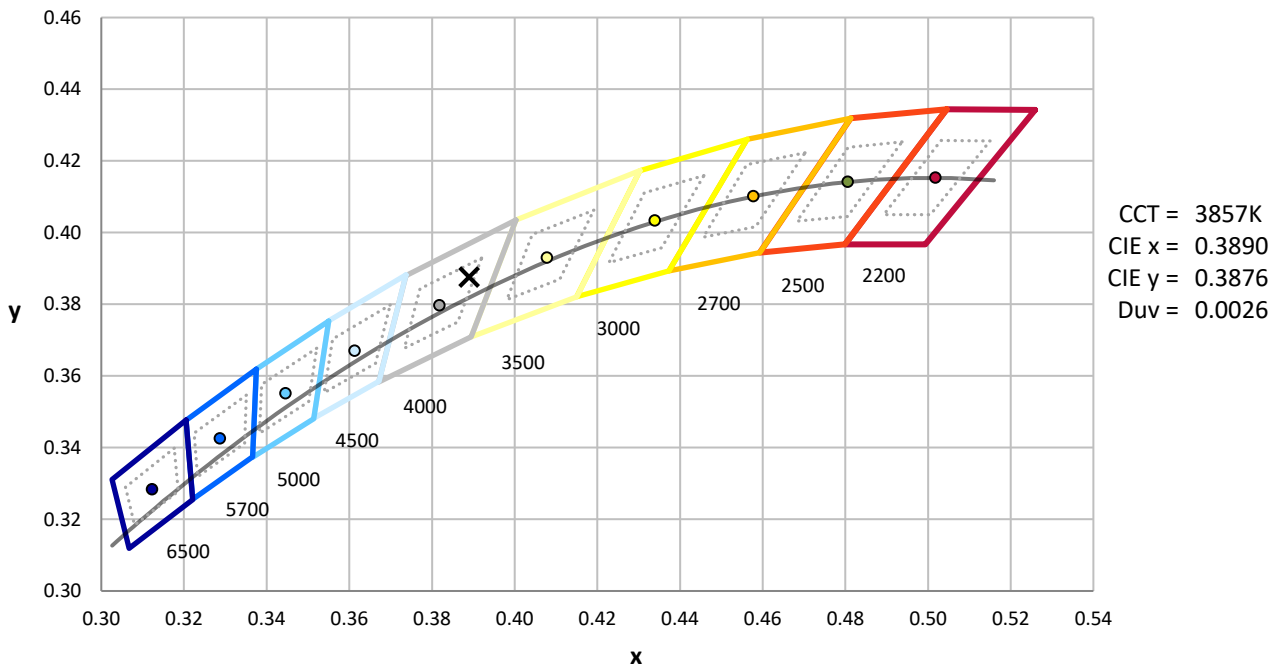
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 2/7/2022         | 8/7/2022             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2021       | 11/29/2022           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/29/2021       | 11/29/2022           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/29/2021       | 11/29/2022           |
| Sphere Thermometer             | ONSET IN0085          | 11/29/2021       | 11/29/2022           |
| Room Thermometer               | ONSET IN0046          | 11/29/2021       | 11/29/2022           |

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**CIE 1931 Chromaticity Diagram**



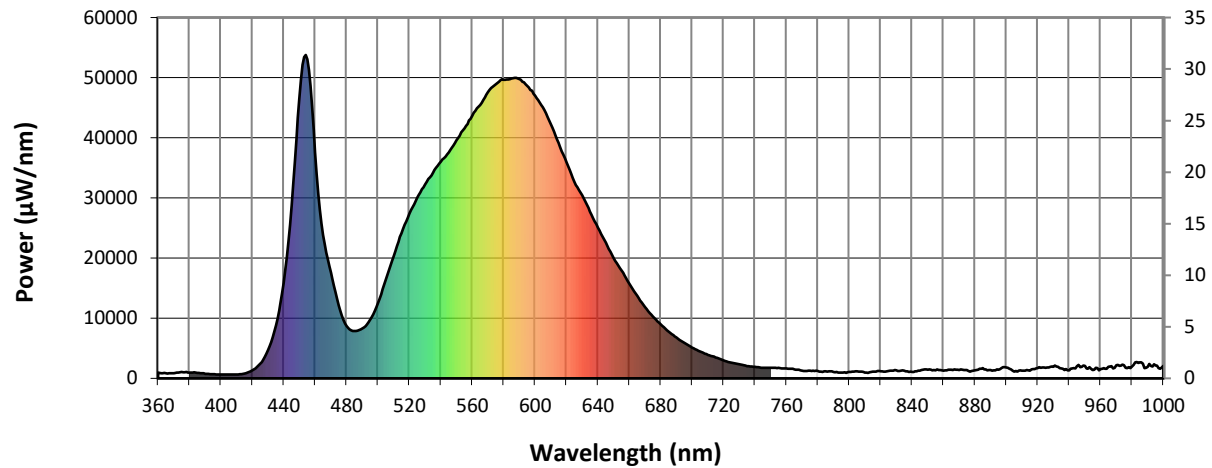
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

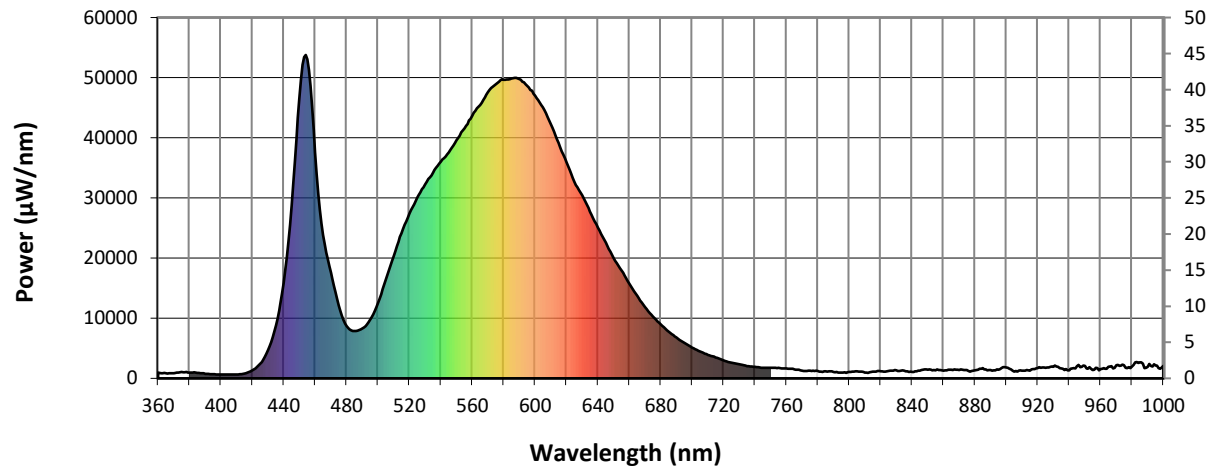


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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 947              | NR               | 490       | 8278             | NR               | 620       | 35923            | NR               | 750       | 1756             | NR               | 880       | 1334             | NR               |
| 365       | 838              | NR               | 495       | 9729             | NR               | 625       | 32734            | NR               | 755       | 1740             | NR               | 885       | 1679             | NR               |
| 370       | 842              | NR               | 500       | 12546            | NR               | 630       | 30434            | NR               | 760       | 1656             | NR               | 890       | 1374             | NR               |
| 375       | 1046             | NR               | 505       | 16368            | NR               | 635       | 27712            | NR               | 765       | 1506             | NR               | 895       | 1455             | NR               |
| 380       | 963              | NR               | 510       | 20312            | NR               | 640       | 25062            | NR               | 770       | 1292             | NR               | 900       | 1837             | NR               |
| 385       | 900              | NR               | 515       | 24128            | NR               | 645       | 22549            | NR               | 775       | 1263             | NR               | 905       | 1101             | NR               |
| 390       | 768              | NR               | 520       | 27426            | NR               | 650       | 19997            | NR               | 780       | 1222             | NR               | 910       | 1253             | NR               |
| 395       | 673              | NR               | 525       | 30032            | NR               | 655       | 17955            | NR               | 785       | 1156             | NR               | 915       | 1283             | NR               |
| 400       | 649              | NR               | 530       | 32270            | NR               | 660       | 15768            | NR               | 790       | 1090             | NR               | 920       | 1728             | NR               |
| 405       | 632              | NR               | 535       | 34190            | NR               | 665       | 13707            | NR               | 795       | 964              | NR               | 925       | 1742             | NR               |
| 410       | 649              | NR               | 540       | 36035            | NR               | 670       | 11877            | NR               | 800       | 1057             | NR               | 930       | 1944             | NR               |
| 415       | 796              | NR               | 545       | 37557            | NR               | 675       | 10247            | NR               | 805       | 1191             | NR               | 935       | 1659             | NR               |
| 420       | 1331             | NR               | 550       | 39565            | NR               | 680       | 8994             | NR               | 810       | 969              | NR               | 940       | 1350             | NR               |
| 425       | 2430             | NR               | 555       | 41537            | NR               | 685       | 7774             | NR               | 815       | 1104             | NR               | 945       | 2049             | NR               |
| 430       | 4669             | NR               | 560       | 43649            | NR               | 690       | 6795             | NR               | 820       | 1159             | NR               | 950       | 2090             | NR               |
| 435       | 8795             | NR               | 565       | 45446            | NR               | 695       | 5887             | NR               | 825       | 1209             | NR               | 955       | 1409             | NR               |
| 440       | 15873            | NR               | 570       | 47583            | NR               | 700       | 5131             | NR               | 830       | 1309             | NR               | 960       | 1549             | NR               |
| 445       | 28752            | NR               | 575       | 48903            | NR               | 705       | 4466             | NR               | 835       | 1271             | NR               | 965       | 1912             | NR               |
| 450       | 46625            | NR               | 580       | 49648            | NR               | 710       | 3906             | NR               | 840       | 1064             | NR               | 970       | 2208             | NR               |
| 455       | 53028            | NR               | 585       | 49883            | NR               | 715       | 3458             | NR               | 845       | 1254             | NR               | 975       | 2191             | NR               |
| 460       | 37593            | NR               | 590       | 49763            | NR               | 720       | 2962             | NR               | 850       | 1460             | NR               | 980       | 1948             | NR               |
| 465       | 23860            | NR               | 595       | 48622            | NR               | 725       | 2602             | NR               | 855       | 1351             | NR               | 985       | 2686             | NR               |
| 470       | 17548            | NR               | 600       | 46962            | NR               | 730       | 2333             | NR               | 860       | 1304             | NR               | 990       | 1925             | NR               |
| 475       | 12160            | NR               | 605       | 45045            | NR               | 735       | 2050             | NR               | 865       | 1417             | NR               | 995       | 2149             | NR               |
| 480       | 8684             | NR               | 610       | 42242            | NR               | 740       | 1899             | NR               | 870       | 1408             | NR               | 1000      | 2060             | NR               |
| 485       | 7873             | NR               | 615       | 39152            | NR               | 745       | 1770             | NR               | 875       | 1361             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



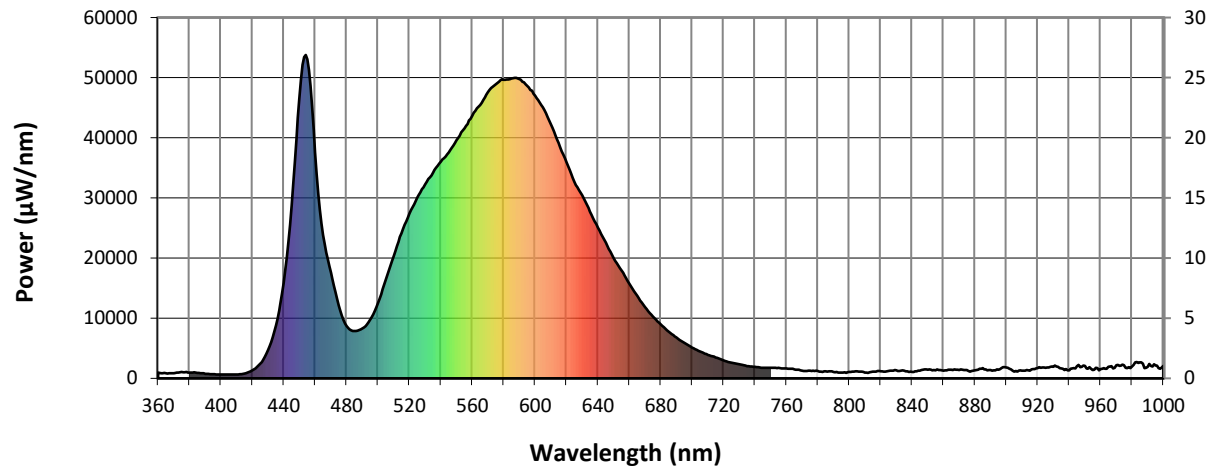
Scotopic Lumens: 4054.9

S/P: 1.51

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 947              | NR               | 490       | 8278             | NR               | 620       | 35923            | NR               | 750       | 1756             | NR               | 880       | 1334             | NR               |
| 365       | 838              | NR               | 495       | 9729             | NR               | 625       | 32734            | NR               | 755       | 1740             | NR               | 885       | 1679             | NR               |
| 370       | 842              | NR               | 500       | 12546            | NR               | 630       | 30434            | NR               | 760       | 1656             | NR               | 890       | 1374             | NR               |
| 375       | 1046             | NR               | 505       | 16368            | NR               | 635       | 27712            | NR               | 765       | 1506             | NR               | 895       | 1455             | NR               |
| 380       | 963              | NR               | 510       | 20312            | NR               | 640       | 25062            | NR               | 770       | 1292             | NR               | 900       | 1837             | NR               |
| 385       | 900              | NR               | 515       | 24128            | NR               | 645       | 22549            | NR               | 775       | 1263             | NR               | 905       | 1101             | NR               |
| 390       | 768              | NR               | 520       | 27426            | NR               | 650       | 19997            | NR               | 780       | 1222             | NR               | 910       | 1253             | NR               |
| 395       | 673              | NR               | 525       | 30032            | NR               | 655       | 17955            | NR               | 785       | 1156             | NR               | 915       | 1283             | NR               |
| 400       | 649              | NR               | 530       | 32270            | NR               | 660       | 15768            | NR               | 790       | 1090             | NR               | 920       | 1728             | NR               |
| 405       | 632              | NR               | 535       | 34190            | NR               | 665       | 13707            | NR               | 795       | 964              | NR               | 925       | 1742             | NR               |
| 410       | 649              | NR               | 540       | 36035            | NR               | 670       | 11877            | NR               | 800       | 1057             | NR               | 930       | 1944             | NR               |
| 415       | 796              | NR               | 545       | 37557            | NR               | 675       | 10247            | NR               | 805       | 1191             | NR               | 935       | 1659             | NR               |
| 420       | 1331             | NR               | 550       | 39565            | NR               | 680       | 8994             | NR               | 810       | 969              | NR               | 940       | 1350             | NR               |
| 425       | 2430             | NR               | 555       | 41537            | NR               | 685       | 7774             | NR               | 815       | 1104             | NR               | 945       | 2049             | NR               |
| 430       | 4669             | NR               | 560       | 43649            | NR               | 690       | 6795             | NR               | 820       | 1159             | NR               | 950       | 2090             | NR               |
| 435       | 8795             | NR               | 565       | 45446            | NR               | 695       | 5887             | NR               | 825       | 1209             | NR               | 955       | 1409             | NR               |
| 440       | 15873            | NR               | 570       | 47583            | NR               | 700       | 5131             | NR               | 830       | 1309             | NR               | 960       | 1549             | NR               |
| 445       | 28752            | NR               | 575       | 48903            | NR               | 705       | 4466             | NR               | 835       | 1271             | NR               | 965       | 1912             | NR               |
| 450       | 46625            | NR               | 580       | 49648            | NR               | 710       | 3906             | NR               | 840       | 1064             | NR               | 970       | 2208             | NR               |
| 455       | 53028            | NR               | 585       | 49883            | NR               | 715       | 3458             | NR               | 845       | 1254             | NR               | 975       | 2191             | NR               |
| 460       | 37593            | NR               | 590       | 49763            | NR               | 720       | 2962             | NR               | 850       | 1460             | NR               | 980       | 1948             | NR               |
| 465       | 23860            | NR               | 595       | 48622            | NR               | 725       | 2602             | NR               | 855       | 1351             | NR               | 985       | 2686             | NR               |
| 470       | 17548            | NR               | 600       | 46962            | NR               | 730       | 2333             | NR               | 860       | 1304             | NR               | 990       | 1925             | NR               |
| 475       | 12160            | NR               | 605       | 45045            | NR               | 735       | 2050             | NR               | 865       | 1417             | NR               | 995       | 2149             | NR               |
| 480       | 8684             | NR               | 610       | 42242            | NR               | 740       | 1899             | NR               | 870       | 1408             | NR               | 1000      | 2060             | NR               |
| 485       | 7873             | NR               | 615       | 39152            | NR               | 745       | 1770             | NR               | 875       | 1361             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1575.2 S/P: 0.59**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 947              | NR               | 490       | 8278             | NR               | 620       | 35923            | NR               | 750       | 1756             | NR               | 880       | 1334             | NR               |
| 365       | 838              | NR               | 495       | 9729             | NR               | 625       | 32734            | NR               | 755       | 1740             | NR               | 885       | 1679             | NR               |
| 370       | 842              | NR               | 500       | 12546            | NR               | 630       | 30434            | NR               | 760       | 1656             | NR               | 890       | 1374             | NR               |
| 375       | 1046             | NR               | 505       | 16368            | NR               | 635       | 27712            | NR               | 765       | 1506             | NR               | 895       | 1455             | NR               |
| 380       | 963              | NR               | 510       | 20312            | NR               | 640       | 25062            | NR               | 770       | 1292             | NR               | 900       | 1837             | NR               |
| 385       | 900              | NR               | 515       | 24128            | NR               | 645       | 22549            | NR               | 775       | 1263             | NR               | 905       | 1101             | NR               |
| 390       | 768              | NR               | 520       | 27426            | NR               | 650       | 19997            | NR               | 780       | 1222             | NR               | 910       | 1253             | NR               |
| 395       | 673              | NR               | 525       | 30032            | NR               | 655       | 17955            | NR               | 785       | 1156             | NR               | 915       | 1283             | NR               |
| 400       | 649              | NR               | 530       | 32270            | NR               | 660       | 15768            | NR               | 790       | 1090             | NR               | 920       | 1728             | NR               |
| 405       | 632              | NR               | 535       | 34190            | NR               | 665       | 13707            | NR               | 795       | 964              | NR               | 925       | 1742             | NR               |
| 410       | 649              | NR               | 540       | 36035            | NR               | 670       | 11877            | NR               | 800       | 1057             | NR               | 930       | 1944             | NR               |
| 415       | 796              | NR               | 545       | 37557            | NR               | 675       | 10247            | NR               | 805       | 1191             | NR               | 935       | 1659             | NR               |
| 420       | 1331             | NR               | 550       | 39565            | NR               | 680       | 8994             | NR               | 810       | 969              | NR               | 940       | 1350             | NR               |
| 425       | 2430             | NR               | 555       | 41537            | NR               | 685       | 7774             | NR               | 815       | 1104             | NR               | 945       | 2049             | NR               |
| 430       | 4669             | NR               | 560       | 43649            | NR               | 690       | 6795             | NR               | 820       | 1159             | NR               | 950       | 2090             | NR               |
| 435       | 8795             | NR               | 565       | 45446            | NR               | 695       | 5887             | NR               | 825       | 1209             | NR               | 955       | 1409             | NR               |
| 440       | 15873            | NR               | 570       | 47583            | NR               | 700       | 5131             | NR               | 830       | 1309             | NR               | 960       | 1549             | NR               |
| 445       | 28752            | NR               | 575       | 48903            | NR               | 705       | 4466             | NR               | 835       | 1271             | NR               | 965       | 1912             | NR               |
| 450       | 46625            | NR               | 580       | 49648            | NR               | 710       | 3906             | NR               | 840       | 1064             | NR               | 970       | 2208             | NR               |
| 455       | 53028            | NR               | 585       | 49883            | NR               | 715       | 3458             | NR               | 845       | 1254             | NR               | 975       | 2191             | NR               |
| 460       | 37593            | NR               | 590       | 49763            | NR               | 720       | 2962             | NR               | 850       | 1460             | NR               | 980       | 1948             | NR               |
| 465       | 23860            | NR               | 595       | 48622            | NR               | 725       | 2602             | NR               | 855       | 1351             | NR               | 985       | 2686             | NR               |
| 470       | 17548            | NR               | 600       | 46962            | NR               | 730       | 2333             | NR               | 860       | 1304             | NR               | 990       | 1925             | NR               |
| 475       | 12160            | NR               | 605       | 45045            | NR               | 735       | 2050             | NR               | 865       | 1417             | NR               | 995       | 2149             | NR               |
| 480       | 8684             | NR               | 610       | 42242            | NR               | 740       | 1899             | NR               | 870       | 1408             | NR               | 1000      | 2060             | NR               |
| 485       | 7873             | NR               | 615       | 39152            | NR               | 745       | 1770             | NR               | 875       | 1361             | NR               |           |                  |                  |

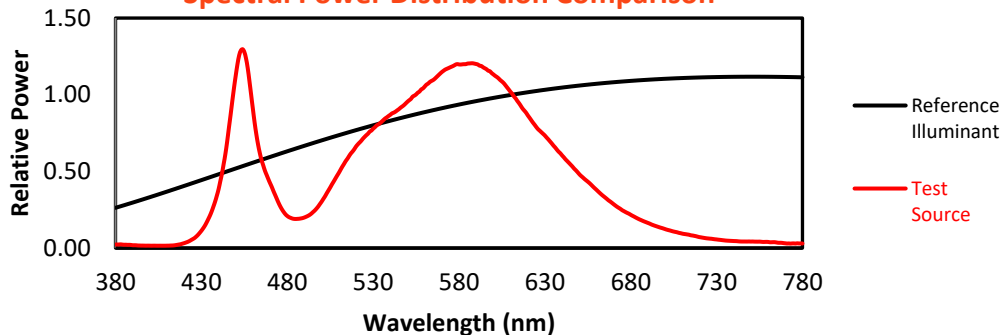
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**TM-30-18**

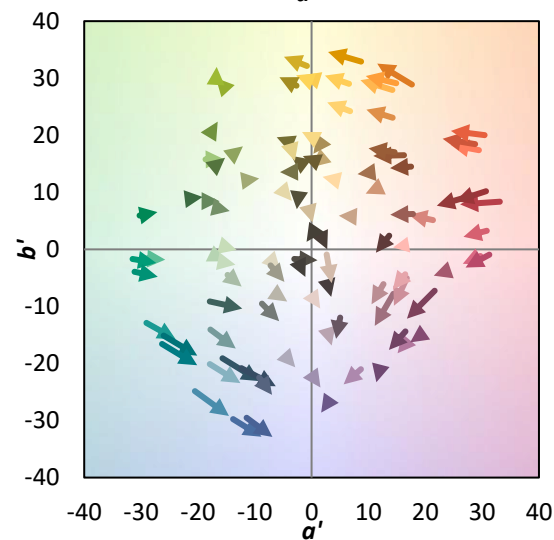
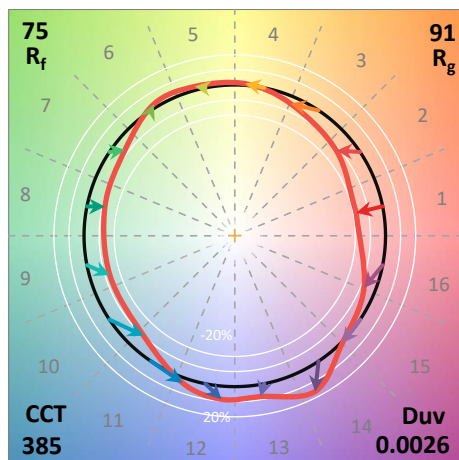
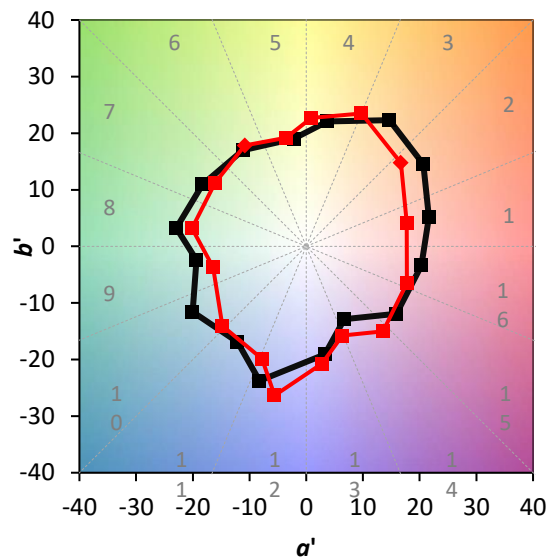
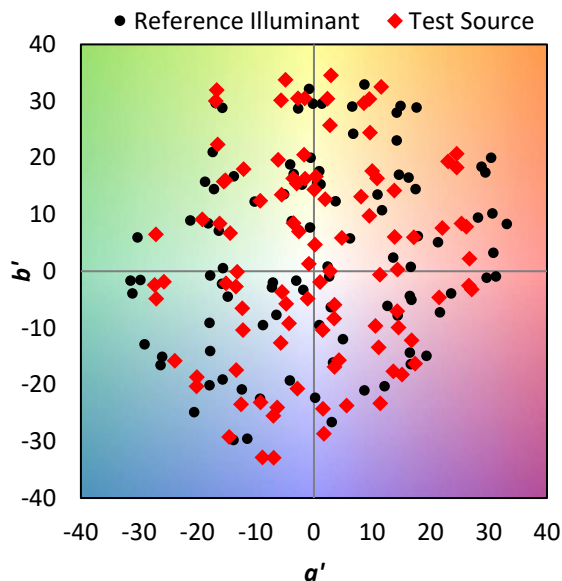
**Summary**

$R_f = 74.8$   
 $R_g = 91$   
 CIE  $R_a = 71.9$   
 $R_g = -35.4$

**Spectral Power Distribution Comparison**



**Color Vector Graphics**



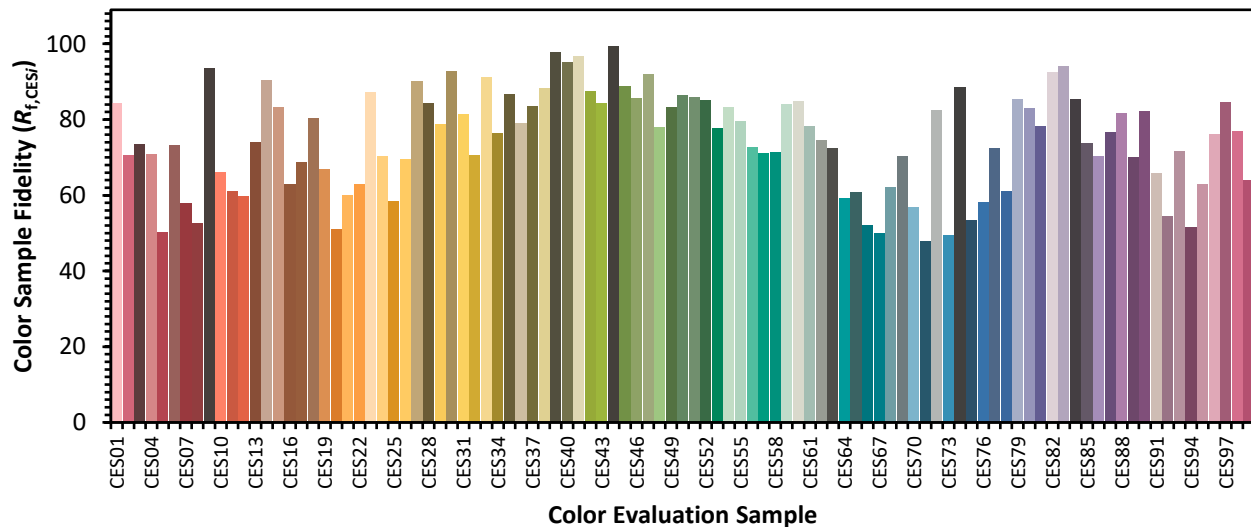


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Individual Sample Fidelity Index ( $R_{f,i}$ )

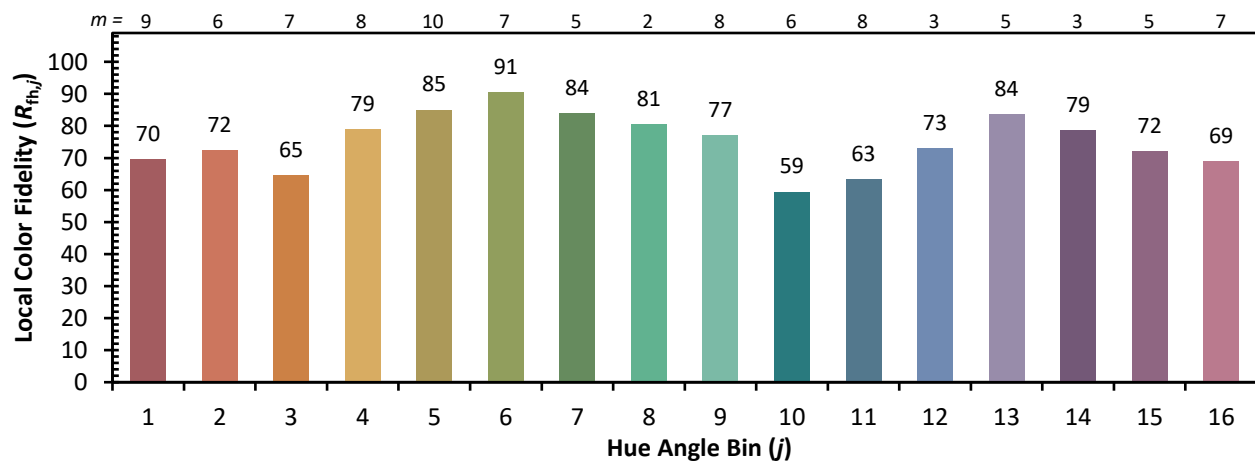
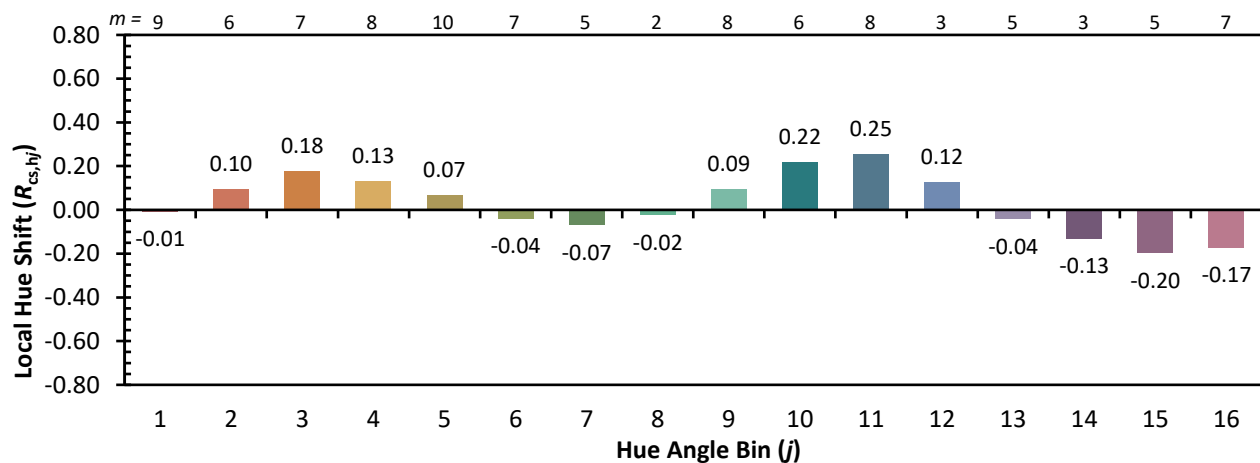
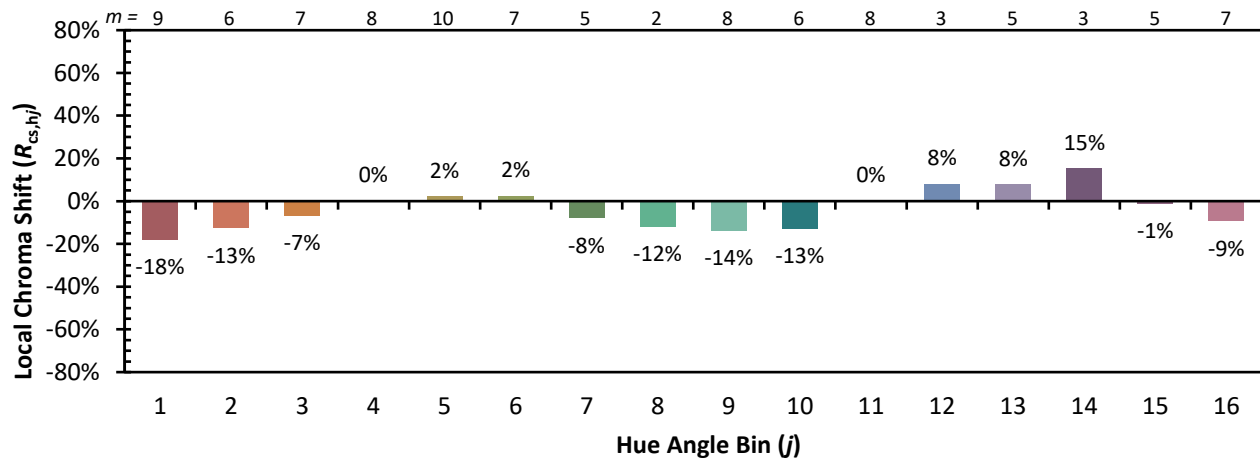
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|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 69 | CES51 = 86 | CES76 = 58 |
| CES02 = 61 | CES27 = 90 | CES52 = 85 | CES77 = 73 |
| CES03 = 30 | CES28 = 84 | CES53 = 78 | CES78 = 61 |
| CES04 = 70 | CES29 = 79 | CES54 = 83 | CES79 = 85 |
| CES05 = 47 | CES30 = 93 | CES55 = 80 | CES80 = 83 |
| CES06 = 50 | CES31 = 81 | CES56 = 73 | CES81 = 78 |
| CES07 = 40 | CES32 = 71 | CES57 = 71 | CES82 = 93 |
| CES08 = 39 | CES33 = 91 | CES58 = 71 | CES83 = 94 |
| CES09 = 29 | CES34 = 77 | CES59 = 84 | CES84 = 85 |
| CES10 = 74 | CES35 = 87 | CES60 = 85 | CES85 = 74 |
| CES11 = 57 | CES36 = 79 | CES61 = 78 | CES86 = 70 |
| CES12 = 63 | CES37 = 83 | CES62 = 74 | CES87 = 77 |
| CES13 = 42 | CES38 = 88 | CES63 = 72 | CES88 = 82 |
| CES14 = 74 | CES39 = 98 | CES64 = 59 | CES89 = 70 |
| CES15 = 71 | CES40 = 95 | CES65 = 61 | CES90 = 82 |
| CES16 = 46 | CES41 = 97 | CES66 = 52 | CES91 = 66 |
| CES17 = 49 | CES42 = 87 | CES67 = 50 | CES92 = 55 |
| CES18 = 56 | CES43 = 84 | CES68 = 62 | CES93 = 72 |
| CES19 = 72 | CES44 = 99 | CES69 = 70 | CES94 = 51 |
| CES20 = 65 | CES45 = 89 | CES70 = 57 | CES95 = 63 |
| CES21 = 86 | CES46 = 86 | CES71 = 48 | CES96 = 76 |
| CES22 = 78 | CES47 = 92 | CES72 = 83 | CES97 = 85 |
| CES23 = 92 | CES48 = 78 | CES73 = 49 | CES98 = 77 |
| CES24 = 91 | CES49 = 83 | CES74 = 88 | CES99 = 64 |
| CES25 = 72 | CES50 = 87 | CES75 = 54 |            |



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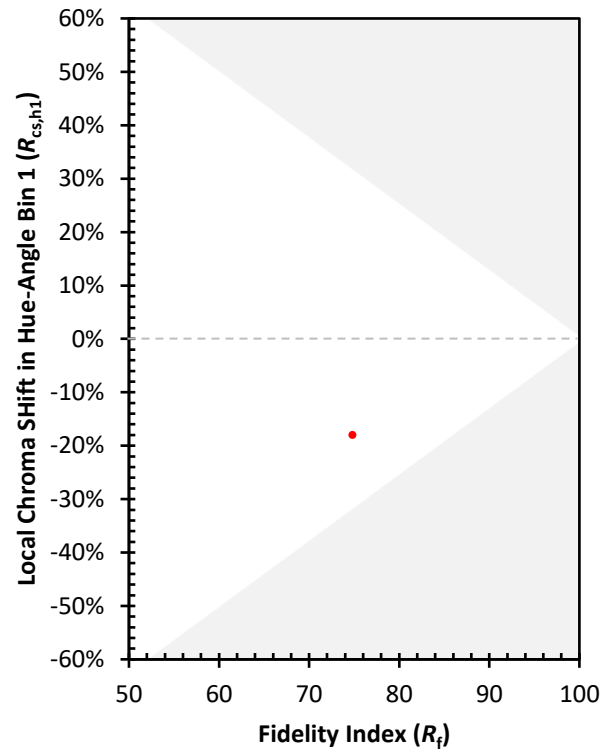
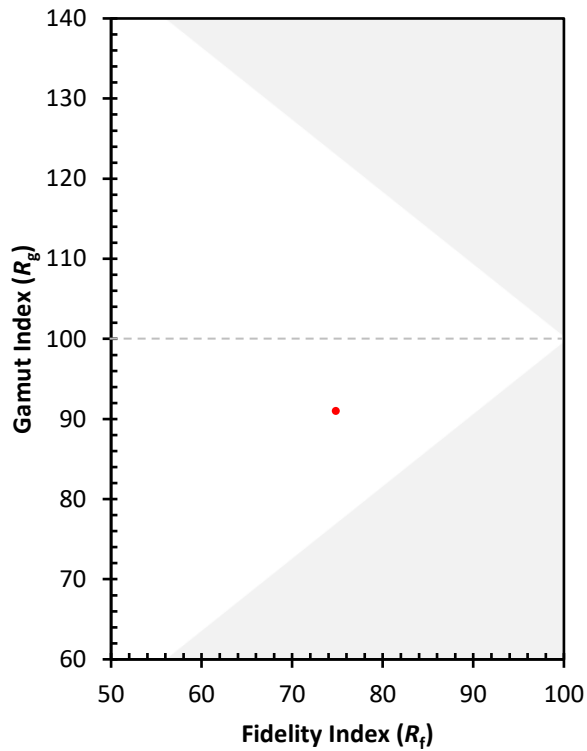
**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)